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FINANCIAL STRUCTURE of MINNESOTA AGRICULTURE

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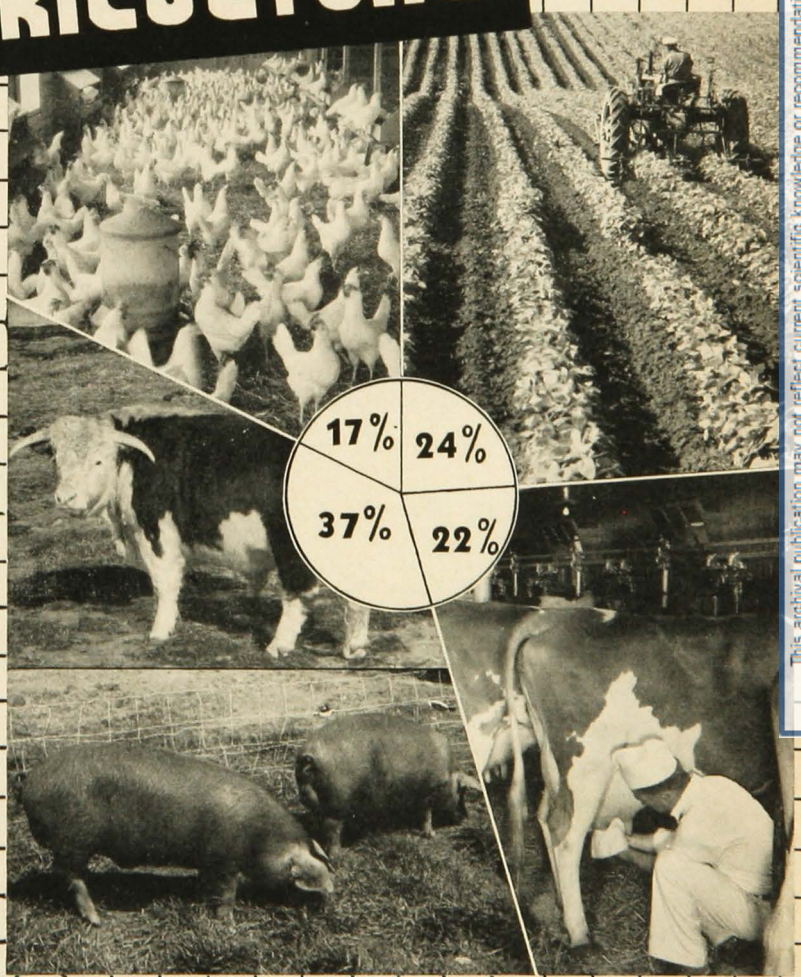

Agricultural Experiment Station
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Financial Structure of Minnesota Agriculture [1]

Rex W. Cox and Warren C. Waite

THE PURPOSE of this bulletin is to describe the changes in the financial structure of Minnesota agriculture since 1910. This has been a period of violent change, including two wars and a serious depression. The price disturbances occurring in this period greatly altered the flow of funds into and out of agriculture. This alteration has influenced the amounts and distribution of the farmers' assets and liabilities, and also the relation between the net equity of the farmers in their business and their debt obligations. Study of these changes, together with a statement of the current financial structure of agriculture, permits some consideration of the possible adjustments during the present postwar period.

Many of the changes in the financial structure of agriculture are related to the variation in income received from the production and sale of agricultural products. The first part of this bulletin accordingly presents an historical record of farm income and an analysis of some of the factors underlying the changes in income. This is followed by an historical account of the cash funds available to farmers, including borrowings, their origin and utilization in production, purchase of capital equipment, building up of cash reserves, and the liquidation of debt. Through this type of analysis, one is able to show the nature and extent of changes in the financial structure that arise from cash transactions, in contrast to those arising from changed capital valuations resulting merely from variations in the price level.

Finally, the financial situation of agriculture is described by means of a balance sheet. Such a financial statement is a collective presentation of the assests, liabilities, and equities of the individual farms in Minnesota at a given date. Because the individual items which comprise the balance sheet are subject to continuing change, successive balance sheets portray both the financial status of agriculture at particular times and the changes in the items of wealth and the obligations and equities arising from their ownership. Broadly speaking, the financial structure of agriculture as shown by successive balance sheets is of significance not only because it identifies the effi-

[1] Acknowledgment is made to O. B. Jesness, Chief of the Division of Agricultural Economics, University of Minnesota, to Harlow W. Halvorson, formerly with the Division, and to Norman J. Wall, Head, Division of Agricultural Finance, Bureau of Agricultural Economics, for their suggestions in the preparation of this bulletin.

ciency of production and stability of ownership of farms and equipment, but also because it indicates the extent to which farmers are able to adjust to new conditions and adopt the most effective means of production. It also reflects the expectation of future income and its distribution. As a result, the financial structure becomes of interest not only to the agricultural population of the state, but also to those who sell industrial products to farmers and to those who are concerned with the establishment or maintenance of a balance of buying power between agriculture and other segments of our economy.

Income and Expenses of Minnesota Farmers

IN CONSIDERING the income from agriculture, there is an important distinction to be made between the income of agriculture as an industry or productive enterprise and the income of the people operating the farms. As an industry, agriculture produces income which flows to people not living on farms as well as to farm operators, while farm operators may derive some income from nonagricultural sources in addition to that derived from agriculture. The difference between these two aspects of the income of agriculture is observed in this section. In it will be found an analysis of the total income of Minnesota agriculture, the distribution of this income among the factors of production, and the total income of farm operators. Several steps are involved in arriving at agricultural income. The first is the determination of the *gross agricultural receipts,* which are the sum of cash receipts from sales of products, and the value of the products consumed on farms where produced. The latter item is included with gross cash receipts not because it provides a monetary return, but because it serves to reduce cash expenditure.

In producing the commodities whose sale or farm use provides the gross agricultural receipts of the state, certain materials and services are purchased from other industries. All of the gross agricultural receipts cannot, therefore, be considered as the product of agriculture alone. In order to arrive at the amount that may be attributed solely to agriculture, it is necessary to deduct current nonlabor cash expense. When this has been done, we obtain what may be called the *gross agricultural product.* This represents the gross production attributable to agriculture in a given year. In order to maintain the agricultural plant at a constant level, however, further outlays or charges must be made. These consist of real estate and personal property taxes and the depreciation of buildings, machinery, and motor vehicles. When these are deducted from the gross agricultural product, we secure *agricultural income before adjustment.* Adjustments are then made for inventory changes, and direct government payments to agriculture are added. This final figure represents the net product of the agricultural industry of Minnesota. In this bulletin this net product is called *agricultural income.*

The agricultural income of the state is distributed among the various people and elements contributing to the net product or having claims to it. In this study the income has been distributed to the various factors of production: hired labor, borrowed capital, and the labor, management, and capital contributed by the farm operator to the farm business. Unfortunately, it is not possible to divide satisfactorily the share of the farm operator into the contribution of his labor, management, and capital. Moreover, included in the returns to the operator are the amounts which should be allocated to unpaid

family labor, but data are unavailable for determining these amounts.

The farm operator also receives income from other sources which should be included in determining his total income particularly in comparing the status of farm operators with the nonfarm population. Two of the items which are included here are wages received for nonfarm work and the rental value of farm residences. Other items of additional income are interest and dividends received from various business investments, but information is not available for their determination.

AGRICULTURAL INCOME

Gross Agricultural Receipts

The gross agricultural receipts from Minnesota agriculture are shown by years in figure 1, and by averages of five-year periods in table 1. In 1910 the receipts were around 200 million dollars. They increased rapidly during World War I reaching 525 million dollars in 1918 and 1919. Following the war there was a sharp decline, then a recovery with receipts averaging more than 475 million dollars from 1925 to 1929. They reached a low of 204 million dollars in 1932, which was less than the average of the period 1910 to 1914. World War II increased receipts greatly, and the total for 1947 was 1436 million dollars, three times that of 1939.

Examination of table 1 indicates the predominate influence of the cash receipts from farm sales on the gross farm receipts. In most years they have constituted fully 90 per cent of the gross receipts and in consequence fluc-

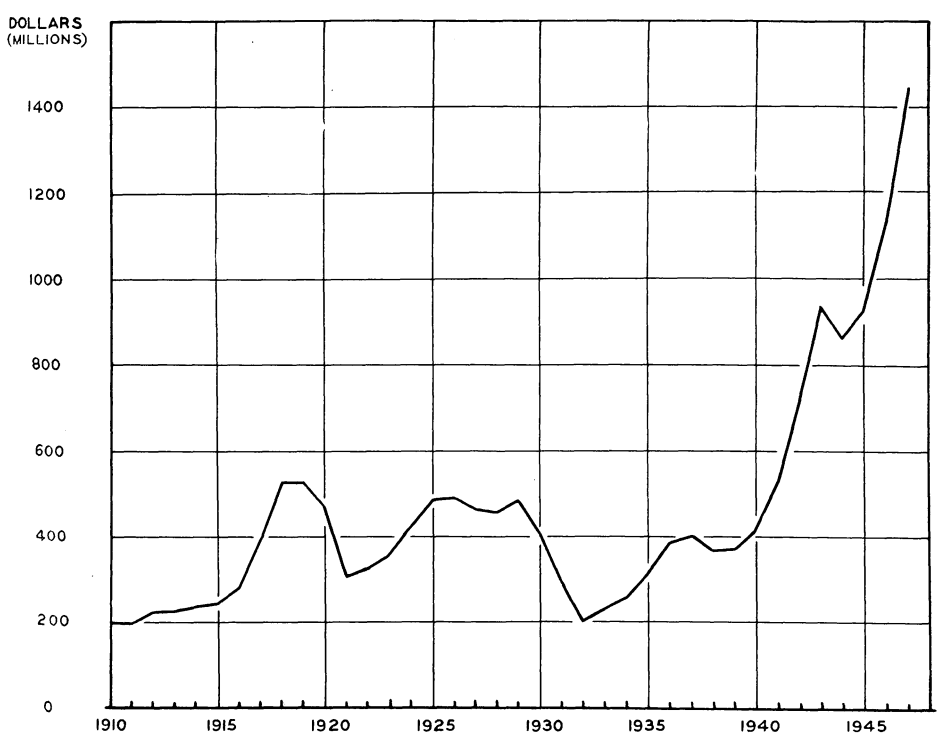

FIG. 1. Gross agricultural receipts.

Table 1. Gross Agricultural Receipts, Minnesota, Five-year Averages 1910-1944, Annual 1945 to 1947

	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945	1946	1947
	Million dollars									
Cash receipts from sales	187.7	343.8	326.1	424.1	246.0	329.2	642.1	859.7	1054.9	1335.6
Value of products consumed on farms where grown	30.5	48.9	49.2	50.7	32.0	39.2	49.2	67.2	75.4	100.1
Gross agricultural receipts	218.2	392.7	375.3	474.8	278.0	368.4	691.3	926.9	1130.3	1435.7

tuations in gross receipts have been closely associated with the fluctuations in cash receipts from farm sales.

CASH RECEIPTS FROM SALES

The income derived from the sale of farm products depends upon both the prices received for these products and the physical quantities of goods sold. The fluctuations in the value of cash sales were nearly identical with the changes in prices from 1924 to 1938, and the general pattern of income prior to 1924 also was determined largely by the fluctuations in prices. The quantities of products sold increased fairly regularly from 1910 to 1924, the total increase amounting to about two-thirds of the 1910-14 figures (figure 2). Subsequent to 1924 and continuing until 1939, the physical volume of sales did not change greatly except for the declines occasioned by the drought of 1934. In recent years, the volume has increased rapidly under the influence of favorable seasons and the pressure of wartime demands. The volume of sales in 1941-45 averaged almost 50 per cent more than in 1935-39.

While the relative contribution of receipts from marketings to the total gross income has not changed greatly

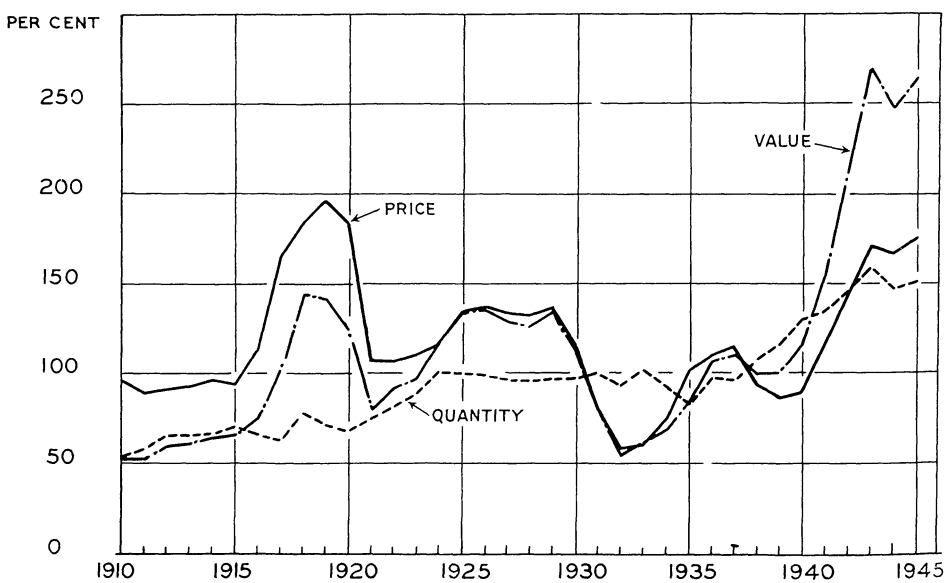

FIG. 2. Indexes of prices, quantities, and values of all farm product sales.

over the period, there have been significant changes in the relative importance of the different sources of receipts (figure 3). The largest change has occurred in the relative importance of crops as a source of cash income. From 1900 to 1924, crops furnished nearly one-half of the cash income from sales, but in recent years only about one-fifth of the income has been derived from this source. Sales of livestock, hogs, cattle and calves, and sheep and lambs, have furnished about 40 per cent of the total cash sales during the past seven years and dairy products about 22 per cent. There has been a notable increase in the sales of products classified as other livestock products which include poultry, eggs, turkeys, and wool. These products have more than doubled in relative importance, increasing from 6 per cent in 1910-14 to 17 per cent in 1940-44.

Although the fluctuations in the cash income from sales depend mainly on changes in the level of prices, the change in the relative importance of the four groups appears to have resulted principally from changes in the physical quantities of sales, and only partly from changed price relationships (figure 4). The quantities of crops sold fluctuate greatly from year to year, depending on conditions during the growing season. There was, however, a general trend downward which terminated with the low output in 1934. The volume of sales rose rapidly during the next six years, reaching a peak in 1940; and it has continued at an unusually high level in recent years, with the exception of 1944. The quantities of livestock sold increased until 1926, then remained about the same until the sales were sharply curtailed as a result of the drouth in 1934. Beginning in 1940,

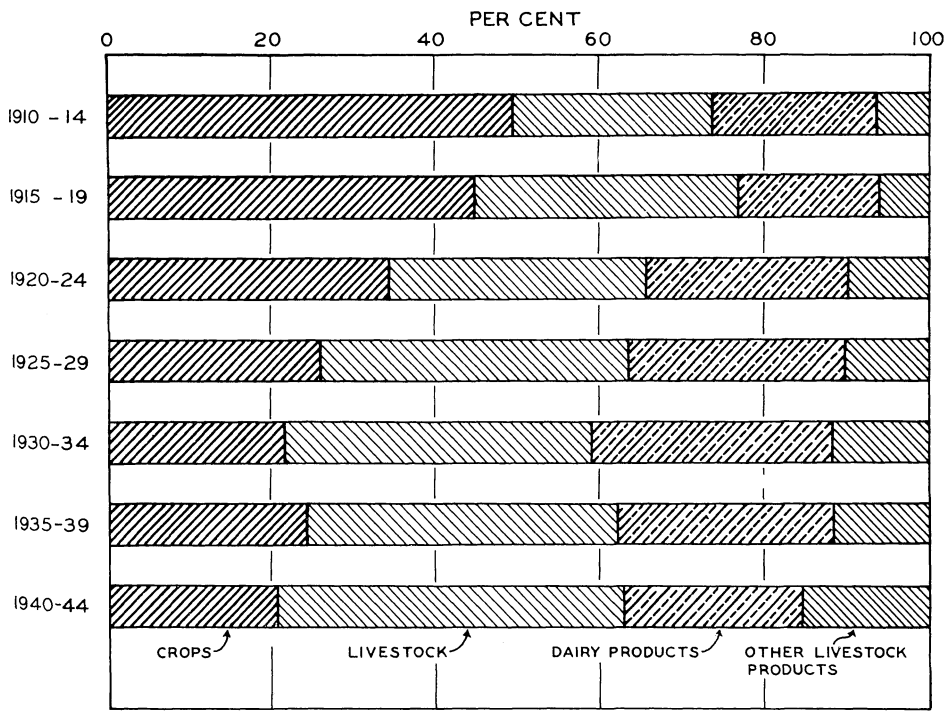

FIG. 3. Distribution of receipts from sales according to source.

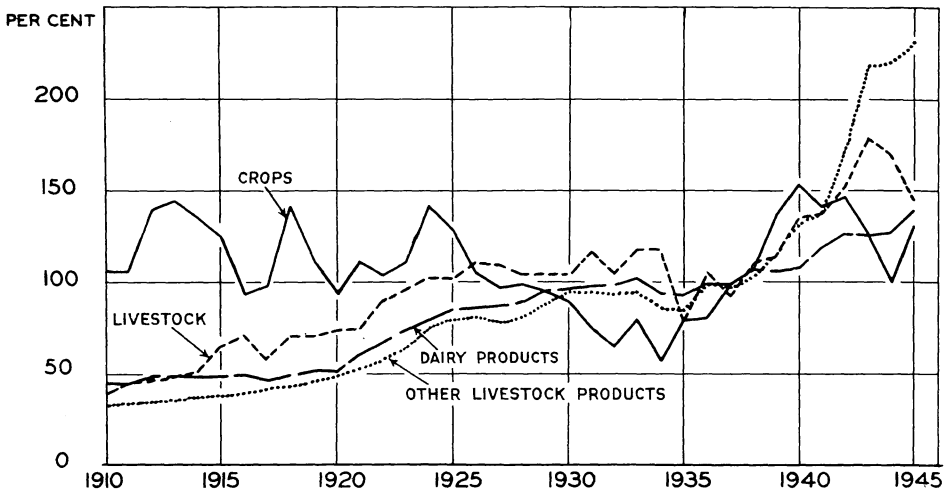

FIG. 4. Indexes of sale quantities of various farm product groups.

the volume of livestock sold experienced a rapid upturn and for the period 1942-45 it averaged 60 per cent above the prewar level. The quantities of dairy products sold did not increase greatly until 1920, but since that year the sales have experienced an almost continuous upward trend which became especially marked subsequent to 1940. The sales during the past five years have been about 27 per cent above the 1935-39 level. The quantities of other livestock products sold have increased steadily throughout the period, except for an interruption occasioned by the 1934 drouth. The increase in sales in recent years exceeded those of any other group of products, and were more than double those of 1935-39.

These changes are shown in somewhat more detail in table 2, which compares the physical quantities sold on the average during the period 1910-14

Table 2. Physical Volume of Sales, Minnesota Agricultural Products, Averages 1910-14 and 1935-39, Annual 1945

	1910-14	1935-39	1945
Wheat, bushels	45,121	19,039	12,686
Corn, bushels	12,069	20,341	57,527
Barley, bushels	16,429	21,153	6,167
Oats, bushels	23,004	24,986	46,795
Rye, bushels	4,780	5,441	886
Flaxseed, bushels	2,877	5,833	10,110
Potatoes, bushels	18,373	11,122	9,074
Soybeans, bushels	.....	132	4,686
Hay, thousand tons	563	325	391
Hogs, thousand hundredweight	3,648	8,068	12,248
Cattle Calves, thousand hundredweight	3,899	7,783	10,930
Sheep-lambs, thousand hundredweight	167	958	1,148
Butterfat, thousand pounds	84,346	209,982	132,480
Milk, thousand hundredweight	6,956	10,832	42,250
Turkeys, thousand pounds	8,554	30,314	67,235
Wool, thousand pounds	2,767	7,601	7,015
Chickens, thousand pounds	23,408	88,262	158,481
Eggs, thousand dozens	41,658	104,242	286,000

Table 3. Current Nonlabor Cash Expenses of Minnesota Agriculture, Five-year Averages 1910-44, Annual 1945 to 1947

	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945	1946	1947
					Million dollars					
Feed	6.8	15.9	15.5	19.1	12.7	21.0	66.9	89.1	103.0	105.9
Livestock purchased	3.2	8.2	6.5	15.3	7.1	16.1	26.8	31.5	34.1	34.2
Automotive expense	0.8	5.1	11.9	18.4	16.4	23.6	35.9	51.2	55.4	64.1
Building and machinery repairs	7.1	9.7	9.9	8.5	6.5	7.4	14.0	20.4	18.2	20.9
Interest paid on non-real estate debt	6.5	12.2	13.4	9.8	5.0	3.9	5.3	4.2	4.0	4.4
Other items	10.4	16.8	17.8	20.7	19.1	20.3	32.1	44.5	53.1	57.0
Total	34.8	67.9	75.0	91.8	66.8	92.3	181.0	240.9	267.8	286.5

with 1935-39 and 1945. Especially striking during the war period has been the shift by farmers from the sale of butterfat in the form of cream to that of whole milk, the great increase of the poultry enterprise, and the increased sales of turkeys. The hog and cattle enterprises also experienced large increases. The declines were largely in the cash crops: wheat, rye, barley and potatoes.

Current Nonlabor Cash Expenses

In order to produce the commodities sold from the farms in the state, certain nonlabor cash expenses were necessarily incurred. These include feed; feeder livestock; automotive, building, and machinery repair; interest on non-real estate debt; and certain other miscellaneous items (table 3). The total of these expenses was about 31 million

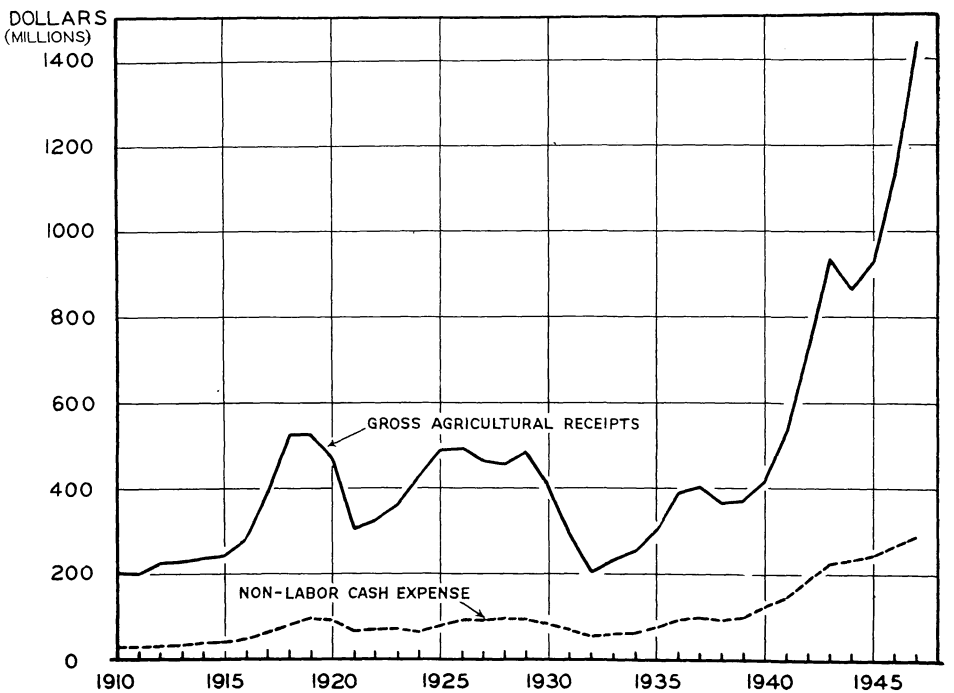

FIG. 5. Gross agricultural receipts and current nonlabor cash expenses.

dollars in 1910 (figure 5). Increasing costs during World War I and the immediate postwar period resulted in a total of 97 million dollars in 1919. Following the decline in 1921 and 1922, they increased gradually for several years and rose to a level of 99 million dollars in 1928. Reduced costs during the depression resulted in a drop to 56 million dollars in 1932. The trend of expenses was definitely upward in subsequent years, and they exceeded 116 million dollars in 1940. The high of 287 million dollars in 1947 was about two and one-half times the figure for 1940.

The more important changes which have occurred in the relative importance of the items of nonlabor cash expenses are the increase in automotive expense and the decline in interest paid on nonreal estate debt (figure 6). Automotive expenses averaged less than 3 per cent of the total nonlabor cash expenses in 1910-14 but accounted for 20 per cent of the total in 1940-44. Interest paid on nonreal estate debt reached a peak in 1920. The proportion that this item was of the total for the group declined from 20 per cent in that year to less than 3 per cent in 1940-44.

Gross Agricultural Product

The gross agricultural product, representing the product of Minnesota agriculture valued at prices in the market, is shown in table 4. The nonlabor cash expense does not change as rapidly as the prices of agricultural products, lagging somewhat on both the rise and decline in general prices. Consequently, gross agricultural product fluctuates somewhat more than gross agricultural receipts. It should be kept in mind that gross agricultural product is a value concept and not a

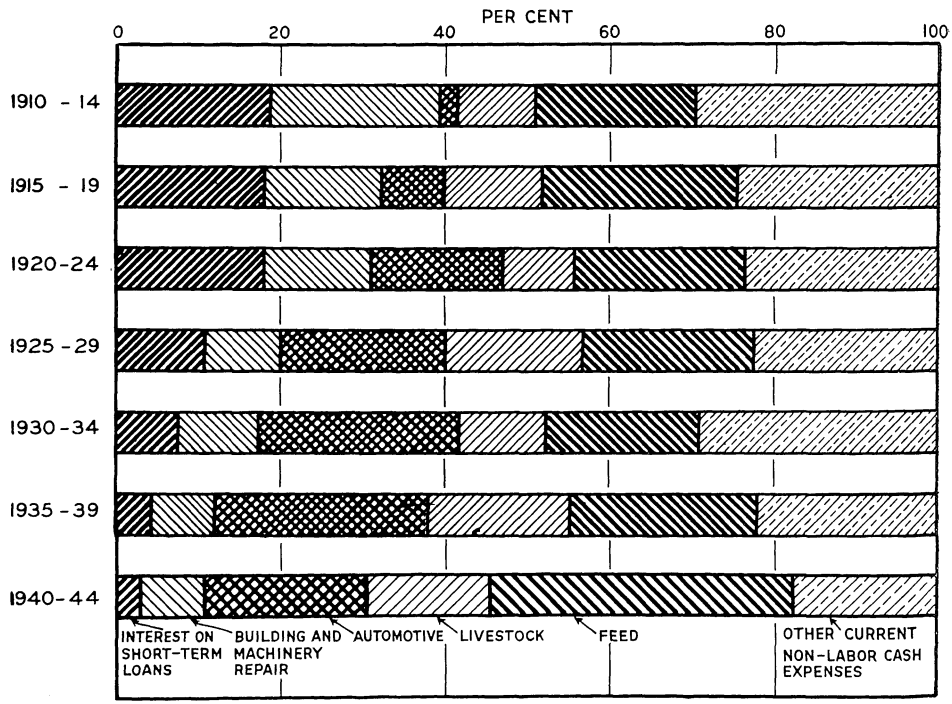

FIG. 6. Distribution of current nonlabor cash expenses among various items.

Table 4. Gross Agricultural Product of Minnesota, Five-year Averages 1910-1944, Annual 1945 to 1947

	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945	1946	1947
					Million dollars					
Gross agricultural receipts	218.2	392.7	375.3	474.8	278.0	368.4	691.3	926.9	1130.3	1435.7
Nonlabor cash expense	34.8	67.9	75.0	91.8	66.8	92.3	181.0	240.9	267.8	286.5
Gross agricultural product	183.4	324.8	300.3	383.0	211.2	276.1	510.3	686.0	862.5	1149.2

physical concept. It thus depends upon prices as well as upon the volume of physical output. For example, in two years, with the same physical output and expenses but with a different level of prices, gross agricultural product would be larger in the year of higher prices. It represents the valuation placed by the market upon the physical product attributable to agriculture.

If prices remained the same, changes in gross agricultural product would arise solely from changes in the physical quantities of the goods attributed to agriculture. This means that if the gross agricultural product is valued at constant prices we secure a rough index of the physical quantities of goods represented by it. This has been done in figure 7 by using the average 1935-39 prices for each year and showing the results as an index, with 1935-39 equal to 100. The similarity of this index to the index of the physical quantity of sales is marked. The two indexes, however, represent different things. The index of physical quantities of sales represents the quantity of agricultural products sold from the farms of the state, while the index of gross agricultural product represents the amount of agricultural products produced which have been designated as agriculture's contribution to the output.

Agricultural Income Before Adjustment

Deduction of depreciation and real estate and personal property taxes from gross agricultural product gives agricultural income before adjustment. These are items that must be covered if agriculture is to maintain its plant and equipment and continue production on the attained level. While depreciation does not represent a cash

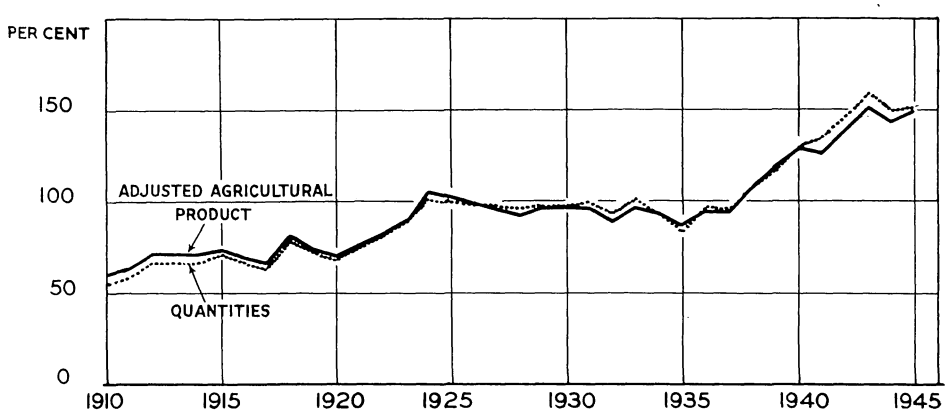

FIG. 7. Indexes of physical volume of sales and adjusted agricultural product.

Table 5. Agricultural Income of Minnesota Five-year Averages 1910-1944, Annual 1945 to 1947

	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945	1946	1947
					Million dollars					
Gross agricultural product	183.4	324.8	300.3	383.0	211.2	276.1	510.3	686.0	862.5	1149.2
Depreciation, real estate and personal property tax	39.6	65.8	90.8	88.1	73.6	75.7	100.8	129.0	143.2	167.6
Agricultural income before adjustment	143.8	259.0	209.5	294.9	137.6	200.4	409.5	557.0	719.3	981.6
Adjustments for inventory changes	+7.3	+4.6	+2.7	−2.2	−6.1	+5.9	+5.5	−57.9	−48.4	−80.4
Government payments					2.6	17.7	30.0	41.7	53.0	22.6
Agricultural income after adjustments for inventory changes	151.1	263.6	212.2	292.7	134.1	224.0	445.0	540.8	723.9	923.8

outlay, it is of special significance because continual depletion and obsolescence means that reserves must be set up for eventual replacement. Taxes might have been considered as a nonlabor cash expense. The decision to incur or not incur taxes, however, does not lie with the farmer, and hence is not like the production expenses included in the nonlabor cash expenses.

The total of these items was fully as large as the nonlabor cash expenses of agriculture until 1935, but in recent years has been appreciably smaller. Real estate, personal property, and special assessment taxes increased rapidly during the 1920's and for a decade they averaged almost 30 million dollars. Following their decline in the 1930's taxes increased gradually until 1946 when the upturn became very marked (table 5).

With the exception of the past three years, adjustment for changes in inventory have had only a small effect upon the agricultural income.[2]

GOVERNMENT PAYMENTS

Government payments to Minnesota farmers have varied from a low of approximately nine million dollars in 1936 to a high of over 53 million dollars in 1946 (table 6). These payments have varied as a proportion of the gross cash receipts from approximately 1.7 per cent in 1947 to about 9 per cent in 1940. In columns 4 and 5 the payments to Minnesota farmers are compared with payments to farmers in the United States as a whole and the receipts from the sale of agricultural products in Minnesota to the United States as a whole. This comparison indicates that Minnesota has received slightly less than a proportionate share of these payments. In 1944-45, however, when dairy payments were an important part of the payments, Minnesota received proportionately more.

Payments were well above average during 1944 and 1945 despite the fact that these were years of unusually large agricultural income. Much of this total, however, consisted of subsidy payments which had been designed to increase production of essential agricultural products without raising price ceilings. Items which were important in this program were milk, pork, beef, and flax. In the earlier years, the payments were for curtailing or adjusting production and for soil-conserving practices.

[2] The adjustment for changes in inventory is the market value in terms of prices at the end of the year, of the increase or decrease in the physical quantities of crops on farms for sale, or of numbers of livestock, whether for sale or not.

Table 6. Direct Government Payments to Minnesota Farmers 1934 to 1947.

Year	Direct government payments			Cash receipts from sales: Minnesota as a proportion of national total
	Amount	Proportion of gross cash receipts	Proportion of national payment	
	Million dollars	Per cent	Per cent	Per cent
1934	16.1	7.62	2.89	3.49
1935	19.7	5.89	2.44	3.76
1936	9.2	2.32	3.13	4.20
1937	17.5	4.17	4.63	4.17
1938	15.3	4.01	3.11	4.23
1939	26.6	6.68	3.22	4.17
1940	40.6	8.93	5.22	4.62
1941	19.6	3.56	3.24	4.33
1942	32.0	4.25	4.59	4.48
1943	22.3	2.55	3.27	4.46
1944	35.7	4.44	4.35	3.98
1945	41.7	4.86	5.45	4.18
1946	53.0	5.02	6.63	4.30
1947	22.6	1.69	6.61	4.42

The agricultural income of the state reached a peak of nearly 400 million dollars in 1918, which was almost three times the estimate for 1910 (figure 8). The decline in 1921 was very abrupt, with the income of that year at the level of 1910. From 1925 to 1929 it fluctuated from 273 to 308 million dollars. The depression reduced it to 76 million dollars in 1932, the low for the entire period of the study. Agricultural income did not recover to the level of the late 1920's until 1941, and averaged 224 million dollars during the period 1935-39. The increase was very great during the World War II period and in 1947 was 924 million dollars.

Distribution of Agricultural Income

The agricultural income of the state is divided among several groups (table

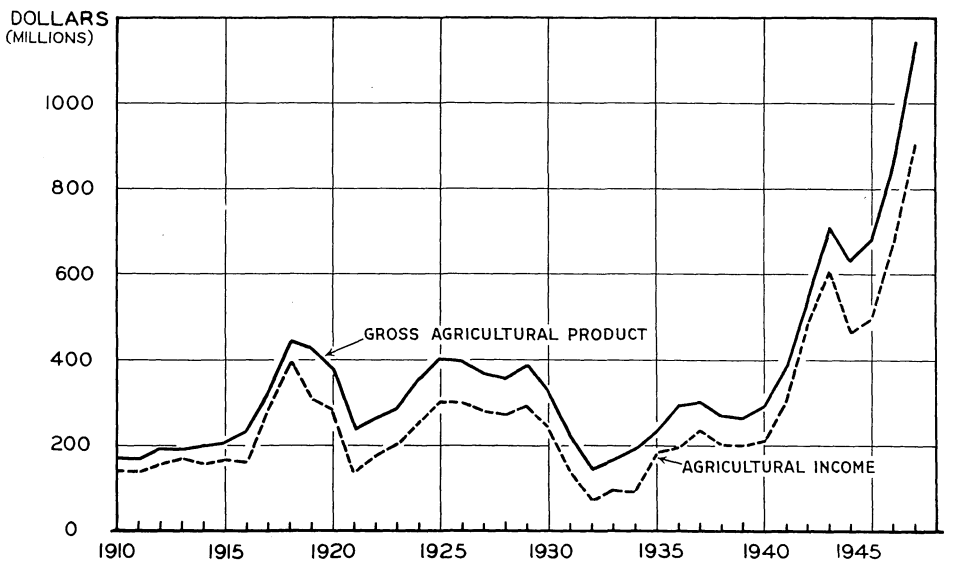

FIG. 8. Gross agricultural product and agricultural income.

Table 7. Distribution of Minnesota Agricultural Income, Five-year Averages 1910-1944, Annual 1945 to 1947

	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945	1946	1947
	Million dollars									
Hired labor	25.9	36.8	38.6	37.1	20.4	23.3	45.7	63.3	69.1	75.3
Interest paid on farm real estate mortgages	12.1	22.2	30.0	28.0	16.3	16.5	14.7	12.7	11.9	11.3
Net rent and government payments to landlords not on farms	6.5	13.7	14.5	21.4	13.7	21.0	39.6	45.8	57.0	69.1
Operators' labor, management, and capital; and family labor	106.6	190.9	129.1	206.2	83.7	163.2	345.1	419.0	585.9	768.1
Total	151.1	263.6	212.2	292.7	134.1	224.0	445.1	540.8	723.9	923.8

7). Chief of these are the hired laborers; the holders of mortgages on farm property who receive interest payments; the net rents and government payments made to landlords not on farms; and the remainder which goes to the operators for their management, labor, capital, and the labor of their families.

The percentage division of this income by five-year periods is shown in figure 9.

The major share of the agricultural income has gone to the farm operators. In most of the five-year periods it was around 70 per cent of the total, but in the 1920-24 and 1930-34 periods it de-

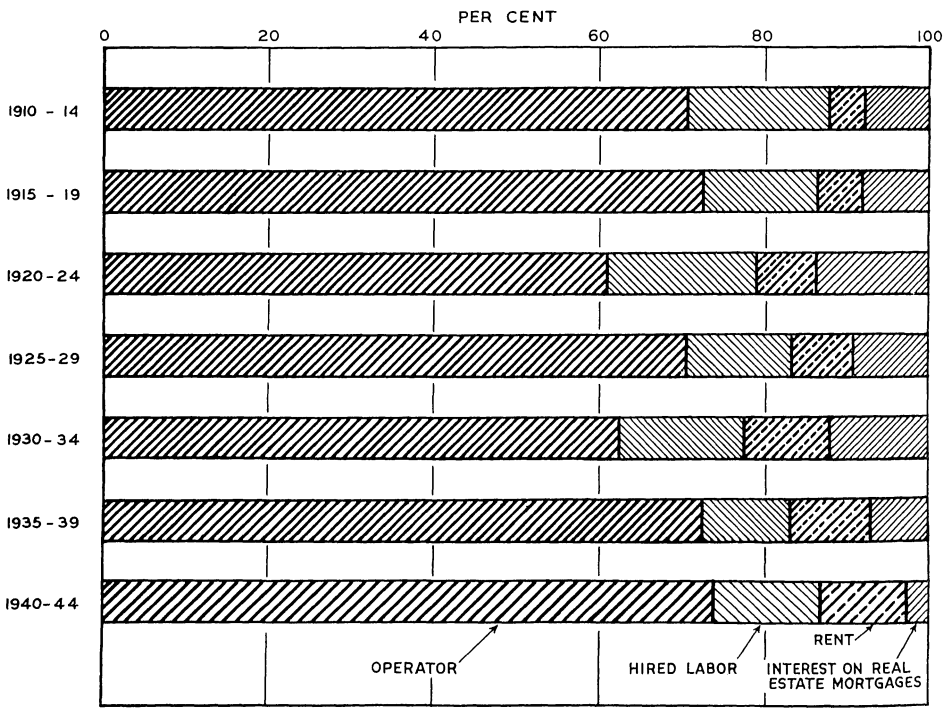

FIG. 9. Distribution of agricultural income among various groups.

clined to about 60 per cent. In the 1940-44 period it approximated 80 per cent of the total.

The proportion of the income going to hired labor has declined markedly during the period under examination. From 1940 to 1944 labor received 10.3 per cent of the total compared with 17.1 per cent in the 1910-14 period. This decline has been brought about by the greater mechanization of agriculture. In the 1915-19 period the payments to hired labor were 36.8 million dollars and 5.1 million dollars for automotive expense, but in the 1940-44 period the outlays were 45.7 million dollars and 35.9 million dollars respectively.

The proportion of the agricultural income going to landlords not on farms in the form of net rents and government payments has tended to increase throughout the entire period. The proportion in 1940-44 was 50 per cent higher than that of 1910-14. The changes appear to have been associated with changes in the amount of tenancy in the state.

Another large change has been in the payment of interest on farm real estate mortgage indebtedness. Interest paid on farm real estate mortgages increased from 1910 to 1924. Accompanying the decline both in the amount of debt and the rate of interest during the past 23 years, interest paid on farm mortgages has declined markedly both in amount and relative importance. In the five years 1940-44 this interest absorbed 3.4 per cent of the agricultural income of the state while in the five years 1920-24 it absorbed 14.1 per cent or more than four times as large a percentage of the agricultural income.

INCOME OF FARM OPERATORS

When the income from sources other than agriculture is added to the operators' management, labor, capital, and

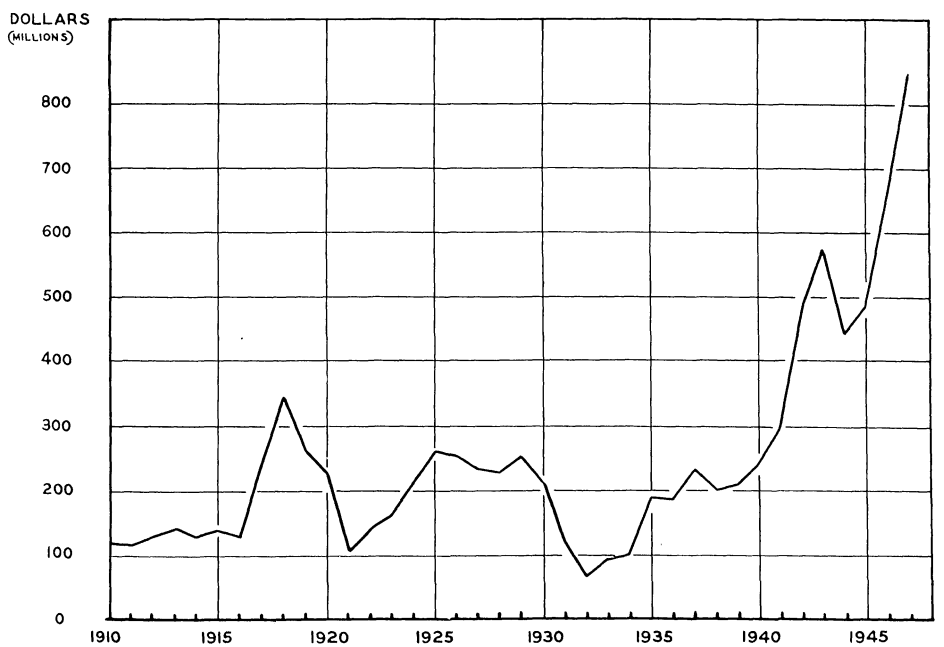

FIG. 10. Total income of farm operators.

the family agricultural labor income, we secure the total income of farm operators for the state (figure 10). This is the income which flows to those actually operating the farms of the state. The items which have been added here are the wages received for nonfarm work and the rental value of the farm house. As was previously mentioned, data are not available to estimate the income from nonfarm investments. This income has, however, been thought to be relatively small except in recent years (table 8).

In the early years, wages received for nonfarm work provided less than 10 million dollars, but in the 1935-39 period they averaged about 15 million dollars and in the 1940-44 period exceeded 25 million dollars. While this income is relatively small for the state as a whole, it is important in certain sections of the state and for a number of operators who have a small operators' income from their farms. The rental value of the farm dwelling is in one sense similar to the value of farm produce used in the home. It does not provide a cash income to the farmer but does serve to reduce his expenses of family living and hence is to be credited as income to the operator in comparing his situation with other classes in the community. It differs from the value of products used in the household in that it is not part of the annual production of agriculture, and hence has been considered as an addition to the operators' income rather than as a contribution to the agricultural product of the state.

Table 9. Distribution of Farmers According to Gross Agricultural Receipts, Minnesota, 1944.

Size of agricultural receipts per farm	Proportion of farms in specified groups	Proportion of total state agricultural receipts in specifed groups
	Per cent	Per cent
Under $600	11.2	.9
600- 999	6.4	1.3
1,000-1,499	7.9	2.6
1,500-2,499	16.8	8.9
2,500-3,999	22.3	18.9
4,000-5,999	18.8	24.2
6,000-9,999	12.4	24.2
10,000 and over	4.2	19.0
Total	100.0	100.0

The agricultural income of the state is provided by farms with a wide range of individual incomes. Data are not available for showing this. It is possible, however, using the census of 1945, to show the number of farms in the state having specified amounts of gross agricultural receipts. This has been done in table 9, which shows the distribution in the year 1944.

The data are expressed in terms of percentages of the total farms in the state and gross agricultural receipts. This permits some rough comparisons of the proportion of the gross agricultural receipts provided by certain proportions of the farms. For example, the one-third of the farms which have the largest receipts provide about two-

Table 8. Total Income of Farm Operators in Minnesota, Five-year Averages 1910-1944, Annual 1945 to 1947

	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945	1946	1947
						Million dollars				
Operators' management, labor, capital, and family labor	106.6	190.9	129.1	206.2	83.7	163.2	345.1	419.0	585.9	768.1
Wages received for nonfarm work	3.8	9.4	8.5	8.2	9.9	14.6	28.9	26.6	26.2	28.0
Rental value of farm home	17.2	25.3	35.0	35.1	29.1	28.3	33.4	41.9	46.5	52.6
Total income of farm operators	127.6	225.6	172.6	249.5	122.7	206.1	407.4	487.5	658.6	848.7

thirds of the gross agricultural receipts of the state. The one-quarter of the farms with the smallest agricultural receipts provide less than five per cent of the gross agricultural receipts of the state. The differences in cash receipts from marketings and number of farms providing them would be even greater, since gross agricultural receipts include the value of products used in the farm household as well as cash receipts from marketings. The relationships expressed as percentages of the total for the state are much more typical of other years than statements of the number or proportion of farms which have gross agricultural receipts of a particular size. The latter are usually valid only for the particular year for which the statement is made.

Source and Application of Cash Funds in Minnesota Agriculture

THE AGRICULTURAL INCOME as derived in the previous section of the bulletin includes both cash and noncash items. For example, allowances are made for the value of the products consumed by families on farms where produced and the rental value of the farm home, as well as an estimate of depreciation of buildings, machinery, and motor vehicles. In this section only the cash funds which pass through the hands of the agricultural industry are traced. The sources of these cash funds may be within the industry itself or they may be obtained elsewhere. The utilization or application of cash funds likewise may be either within or outside of the industry.

The financial structure of agriculture is constantly being altered, particularly in periods of price disturbances, because of changes in the flow of cash funds in and out of agriculture. In consequence, an analysis of the flow of these funds is preliminary to the study of the balance sheet of Minnesota agriculture, which appears in the third section of this bulletin.

The statement of the flow of cash funds shows the amounts obtained from the several sources and their disposition into various channels during the year (table 10). The statement gives first the funds derived from marketings, government payments, and wages received by farmers for work off the farm. The production, personal and living expenses are then subtracted from the sum of these items. The remainder, or the net cash income of agriculture, represents the surplus above the normal business and living expenses. To the net cash income is added the net decline in financial assets which include currency, bank deposits, government bonds, and investments in cooperatives. This decline represents a shift by farmers of these assets into funds for current use. Similarly, the increase in real estate mortgages and real estate debt have been added to the cash funds, since it constitutes new funds available for expenditure. Whenever the financial assets decline and the loans increase, the respective items are sources of funds. On the other hand, an increase in the savings or a decline in loans is an application of funds. Within some years, the changes in loans represent mainly the conversion of one type of loan to another. For example, in the early 1920's a significant proportion of the funds provided by real estate mortgages were applied to the retirement of nonreal estate loans.

The funds provided by the several sources represent the money which is available for the expansion of farm operating capital, such as building, machinery, motor vehicles, and other equipment; in some cases an increase in financial assets, or debt retirement,

Table 10. Sources and Application of Cash Funds in Minnesota Agriculture, Five-year averages 1910-1944, Annual 1945 to 1947

	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945	1946	1947
Source of funds					Million dollars					
Cash receipts										
Sales of products	187.7	343.8	326.1	424.1	246.0	329.2	642.1	859.2	1,054.9	1,335.6
Government payments	.....	.....	.....	.....	2.6	17.7	30.0	41.7	53.0	22.6
Wages for nonfarm work	3.8	9.4	8.5	8.2	9.9	14.6	28.9	26.6	26.2	28.0
Total	191.5	353.2	334.6	432.3	258.5	361.5	701.0	927.5	1134.1	1386.2
Less cash expenses										
Production	82.2	143.8	172.7	186.5	129.2	156.1	267.3	345.5	382.0	410.1
Personal and living	72.0	131.8	124.6	162.8	96.2	124.1	148.9	159.5	212.5	295.0
Total	154.2	275.6	297.3	349.3	225.4	280.2	416.2	505.0	594.5	705.1
Net cash income	37.3	77.6	37.3	83.0	33.1	81.3	284.8	422.5	539.6	681.1
Other sources										
Net borrowings										
Real estate mortgages	31.9	36.3	19.3	.....	.....	.....	.....	.....	.....	.....
Nonreal estate debt	5.8	26.1	.....	.....	.....	8.5	.....	.....	1.4	8.5
Total	37.7	62.4	19.3	.....	.....	8.5	.....	.....	1.4	8.5
Net decrease of financial assets	.....	.....	.3	6.1	8.8	.....	.....	.....	.....	.....
Total funds provided	75.0	140.0	56.9	89.1	41.9	89.8	284.8	422.5	541.0	688.4
Application of funds										
New construction	17.3	17.2	20.0	16.0	8.2	13.5	19.0	24.5	25.0	27.2
Purchase of machinery and motor vehicles	23.3	37.4	35.1	46.2	24.1	45.9	53.5	57.9	108.3	129.6
Net debt payment										
Real estate mortgages	.....	.....	.....	16.0	3.4	1.2	14.3	31.0	15.9	.....
Nonreal estate debt	.....	.....	4.7	4.5	8.9	.....	1.2	5.8	.....	.....
Total	.....	.....	4.7	20.5	12.3	1.2	15.5	36.8	15.9	.....
Net increase in financial assets	3.8	4.0	.....	.....	.....	9.6	84.1	140.3	75.7	25.0
Other uses	30.6	81.4	—2.9	6.4	—2.7	19.6	112.7	163.0	316.1	493.4
Total funds applied	75.0	140.0	56.9	89.1	41.9	89.8	284.8	422.5	541.0	688.4

and other uses. The latter category is a residual classification and the amounts included therein are those necessary to obtain a balance between funds provided and funds applied as far as it has been possible to estimate them. It includes items for which expenditures are made, but for which no estimate can be determined. These items consist of down payments on land purchases, payment of nonreal estate debt to individuals, other investments besides government bonds and cooperatives, and purchase of household equipment. In addition, this category necessarily includes both state and federal income tax payments. Any error involved in the estimates made for the many items in the fund statement will be reflected in the amounts of funds estimated as available for other uses. While the individual items are subject to some error, the estimates are sufficiently accurate so that significance may be attached to the trends of the changes in the fund statement over the period of time included in this study.

SOURCES OF CASH FUNDS

In general, net cash income has been the main source of cash funds, although during the period 1910-23 it was greatly supplemented by funds obtained from both real estate and nonreal estate loans (figure 11). There were some years within this period when funds provided

by loans actually exceeded the net income. For example, real estate loans accounted for 42 per cent and nonreal estate loans 19 per cent of the total funds in 1913-16. The corresponding figures for 1920 were 58 per cent and 7 per cent respectively. During the intervening period of three years, the increase in loans was large, but as the net cash income was at a high level the proportion of the funds supplied by both types of loans was only 37 per cent of the total.

Subsequent to 1923, loans did not show a net increase until 1934, but they continued as a relatively important source of funds through 1941, although the proportion of the total funds supplied was much smaller than in some of the earlier periods. Real estate loans alone provided 38 per cent of the funds in 1934 and both the combined real estate and nonreal estate loans provided almost 30 per cent in the following year. Only nonreal estate loans showed a net increase in 1937-39 but even with the higher net incomes then prevailing, these loans accounted for 12 per cent of the total cash funds of the period.

The financial assets which had been built up during the period of World War I amounted to 222 million dollars at the beginning of 1920. These assets showed a marked decline in 1921 and the funds they provided were 47 per cent of the total funds available for expenditure. From 1925 through 1933, the financial assets declined each year. The funds thus supplied averaged about 8 per cent of the annual total. Subsequent to 1933 these assets increased, thereby indicating an application rather than a source of provision of funds.

Net income has been practically the sole source of funds during the past six

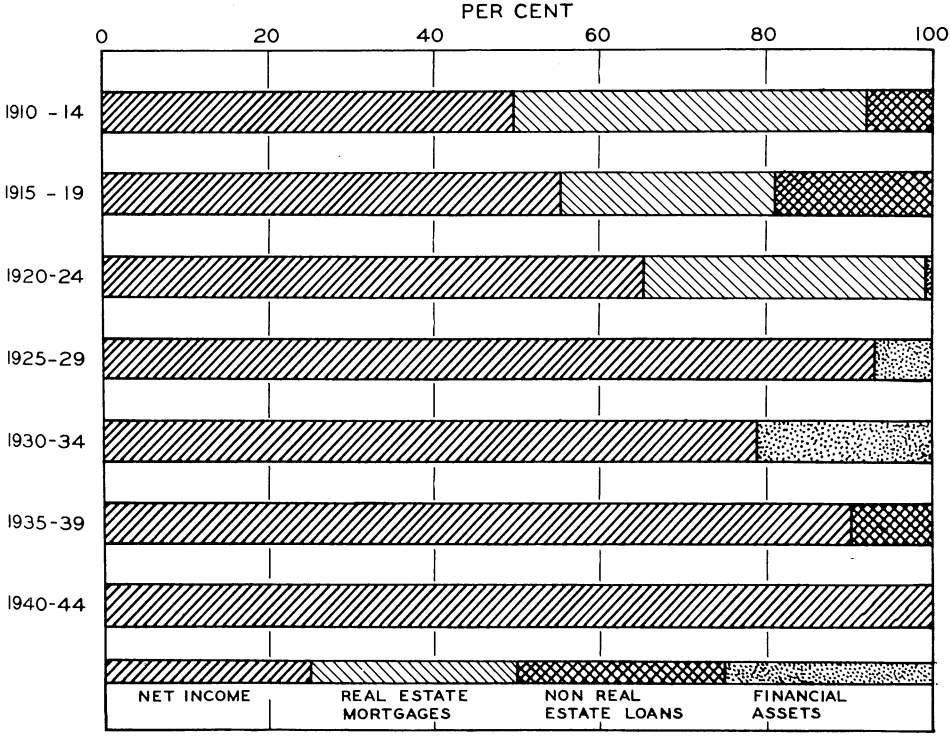

FIG. 11. Distribution of cash funds according to source.

years, with the exception of 1947 when both real estate and nonreal estate loans increased slightly. With the exceptionally high level of income, the available funds have been at an all-time high, exceeding by many times those of any previous period. It is particularly important to note the contrast of this period with that of World War I, when net borrowings supplied a significant proportion of the total cash funds.

APPLICATION OF FUNDS

Construction costs and purchase of machinery and motor vehicles normally absorb a large proportion of the cash funds made available and utilized (figure 12). Construction expenditures show no consistent trend over the period, 1910-47, but the annual expenditure for the purchase of machinery and motor vehicles has increased rapidly because of the marked mechanization of agriculture. The sharp increase in 1946 and 1947 was due in part to increased supplies and in part to the increased cost per machine or motor vehicle.

The decline in the debt obligations of farmers may be due to voluntary retirement, forced liquidation, or a readjustment of the principal through debtor and creditor agreement. The expansion of current production during the period 1915-1920 was accompanied by a large increase in nonreal estate debt. Loans obtained from commercial banks amounted to 223 million dollars on January 1, 1920. From 1920 to 1935 the retirement of this debt was an important utilization of funds, although in the early 1920's the retirement in many cases merely represented the conversion of nonreal estate debt into real estate mortgages. The decline in prices

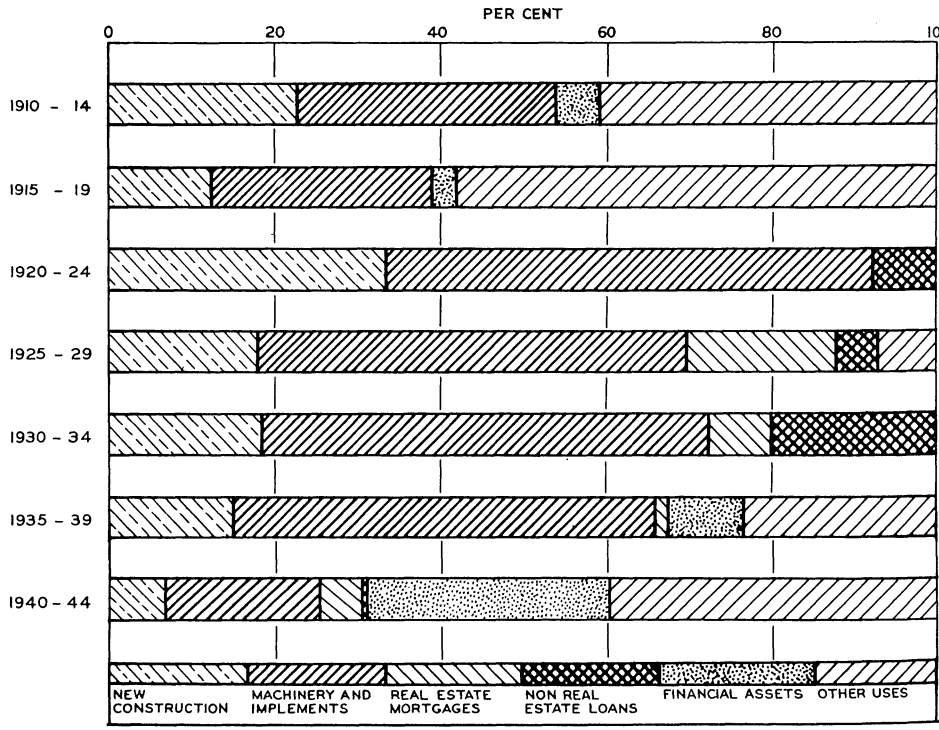

FIG. 12. Distribution of cash funds according to use.

during the early 1920's resulted in the value of the collateral pledged as security for the nonreal estate loans dropping below the amount of the principal. In consequence, on demand of the creditors, a considerable proportion of these loans was converted to longer term loans with real estate as security.

Funds used in the voluntary retirement of real estate debt represented a significant proportion of the total disposition of funds from 1924-1933. However, the voluntary retirement accounted for only about one-half of the total decline of the real estate debt during the latter part of this period. Forced liquidation and debtor and creditor agreements were important forces in accounting for much of the reduction during the depression years.

The net reduction in both real estate and nonreal estate debt during the early 1930's may appear surprisingly high in view of the low level of income prevailing during those years. New borrowings and repayment of old obligations occur simultaneously. During the years when the depression was most severe, the volume of new loans was greatly reduced with the result that debt payment exceeded new borrowings. It is likely that the actual repayment of loans in 1935-41 was larger than in the previous five years, but with an increased volume of new borrowings, the funds provided thereby exceeded those applied to the repayment of existing obligations. In consequence, the data show a net addition to the cash funds.

The decline in farm mortgage debt from January 1, 1942, to January 1, 1948, averaged 22 million dollars annually and accounted for about 5 per cent of the total disposition of funds during these years. In view of the high level of income and restriction on alternative expenditures because of shortages, this decline may be considered quite moderate. The use of funds to retire old obligations, however, was probably larger than the data indicate inasmuch as new loans were being made on the basis of a much higher appraisal.

The financial assets increased each year subsequent to 1933 and reached a peak of 866 million dollars on January 1, 1948. The marked increase in the application of funds to the building up of financial reserves in recent years has been possible because of the high income level and the existence of shortages or restrictions placed on new construction and other improvements and the purchase of farm equipment. The utilization of the net income in adding to the financial reserves averaged more than 25 per cent of the total funds applied or disposed of in the various channels during 1942-47. As will be shown in the concluding section of this bulletin, the use of the cash funds in this manner is one of the main reasons why the financial structure of Minnesota agriculture is characterized by a high degree of liquidity at the present time.

Balance Sheet of Minnesota Agriculture

THE FINANCIAL STRUCTURE of agriculture at a particular time can best be examined by the use of a balance sheet. This portrays the assets, both physical and financial; liabilities; and proprietors' equity (table 11). The relationship between these divisions corresponds to that prevailing in the usual accounting procedure and is expressed by the equation: Assets=Liabilities+Proprietors' Equity. The physical assets in agriculture consist of real estate and such nonreal estate items as crops, livestock, machinery, motor vehicles, and equipment. The changes shown in the valuation of real estate are due in part

Table 11. Balance Sheet of Minnesota Agriculture, January 1, Five-year Averages 1910-44, Annual 1945 to 1948

	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945	1946	1947	1948
Assets						Million dollars					
Physical											
Real estate	1,370.0	2,035.9	2,951.0	2,260.0	1,651.6	1,434.0	1,563.8	1,833.7	2,057.3	2,247.9	2,438.8
Nonreal estate											
Crops	90.1	147.8	141.7	150.3	91.0	102.4	192.7	292.3	290.8	358.6	497.1
Livestock	196.7	286.6	248.3	281.0	204.5	232.1	383.6	451.8	490.3	619.0	683.4
Machinery and motor vehicles	62.6	108.0	160.6	152.8	154.5	159.5	245.8	353.2	341.7	387.5	455.7
Total nonreal estate	349.4	542.4	550.6	584.1	450.0	494.0	822.1	1,097.3	1,122.8	1,365.1	1,636.2
Total physical	1,719.4	2,578.3	3,501.6	2,844.1	2,101.6	1,928.0	2,385.9	2,931.0	3,180.1	3,613.0	4,075.0
Financial											
Deposits and currency	70.4	103.3	156.3	151.5	122.8	134.1	203.7	340.4	425.1	483.8	490.0
U. S. bonds	.....	10.1	36.4	30.5	16.4	2.9	45.0	191.5	239.6	252.4	268.0
Investments in cooperatives	10.1	16.2	18.5	26.9	23.4	25.7	54.5	83.0	92.0	102.0	108.0
Total financial	80.5	129.6	211.2	208.9	162.6	162.7	303.2	614.9	756.7	838.2	866.0
Total assets	1,799.9	2,707.9	3,712.8	3,053.0	2,264.2	2,090.7	2,689.1	3,545.9	3,936.8	4,451.2	4,941.0
Liabilities											
Real estate mortgages	197.5	372.9	575.6	515.9	427.5	387.7	360.6	304.6	273.6	257.7	244.5
Nonreal estate debt	69.9	143.9	199.3	129.5	87.8	58.8	97.2	82.1	76.3	77.7	86.2
Total liabilities	267.4	516.8	774.9	645.4	515.3	446.5	457.8	386.7	349.9	335.4	330.7
Proprietors' equities	1,532.5	2,191.1	2,937.9	2,407.6	1,748.9	1,644.2	2,231.3	3,159.2	3,586.9	4,115.8	4,610.3
Total liabilities and proprietors' equities	1,799.9	2,707.9	3,712.8	3,053.0	2,264.2	2,090.7	2,689.1	3,545.9	3,936.8	4,451.2	4,941.0

to changes in farm acreage but principally to changes in acre value. Although changes in the valuation of the other physical assets are also influenced by changes in the price level, the changes in amounts or number have a larger relative influence on the valuations than in the case of real estate. The financial assets include currency and bank deposits, government bonds, and investments in cooperatives. Farmers have investments in other enterprises but they have not been included in this study because of inadequate data by which to measure their amount. Dollar amounts of currency, deposits, and bonds are not affected by changes in the price level, but their real value or purchasing power depends on the price level of the materials and services which farmers buy.

The liabilities of agriculture consist of the debt obligations as real estate mortgages and nonreal estate loans. The data representing nonreal estate loans in this study include only those obtained from commercial banks and government credit agencies which for the most part became factors of some importance during the 1930's. Information is not available on the amount of nonreal estate loans obtained from individuals and other sources or on credit extended by stores, both short-time and on installment purchases. In lieu of any voluntary adjustment, the valuation of the liabilities change only with the addition or decline in the volume of loans. That is, their valuation is more or less fixed from the time of their origin until the date of maturity or their payment.

The proprietors' equity is the difference between the assets and liabilities. It may be divided in two parts: The landowners' equity in real estate, and the operators' equity in nonreal estate assets. The former is derived by subtracting the amount of real estate mortgage debt from the real estate valuation, and the latter by subtracting the nonreal estate debt from the combined valuation of the nonreal estate physical assets and the financial assets.

The composite assets of Minnesota agriculture approximated 4.9 billion dollars on January 1, 1948, compared with 2.2 billion on January 1, 1940, and 4.2 billion dollars on the same date in 1920 (figure 13). Farm real estate was valued at 2.4 billion on January 1, 1948; other physical assets 1.6 billion; and financial assets almost .9 billion dollars. Creditors had a claim of less than .4 billion

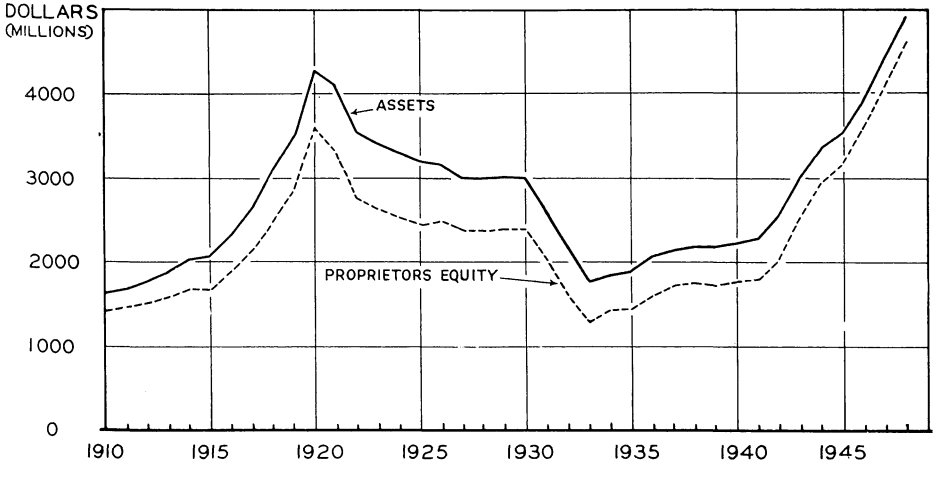

FIG. 13. Assets, liabilities, and proprietorship.

dollars on these assets, which left a residual of 4.6 billion dollars representing the proprietors' equity. The large increase in the valuation of some of the assets in recent years reflects mainly price changes and accumulated financial assets rather than physical changes in the farm plant, although there were some increases in the volume of crop and livestock physical inventories in certain years.

ASSETS

Real Estate

Real estate is by far the farmers' most important single asset (figure 14). The fluctuation in the value of real estate, in consequence, has had a large influence on the total valuation of assets and on the proportion of the total valuation that is represented by the proprietors' equity. The index of estimated value per acre was 129 on March 1, 1946, or about 54 per cent higher than the prewar average. By the end of 1947 it had risen to 151, but it was still much below the peak of 213 reached at the height of the land boom following World War I.

The increase in the valuation of farm real estate from 1.4 billion dollars on January 1, 1940, to 2.4 billion at the beginning of 1948 was due almost wholly to an increase in prices. A substantial increase in expenditures for new construction and improvements accounted for part of the increase. However, acreage in farms increased only slightly. The change from 1.5 billion on January 1, 1914, to 3.3 billion on January 1, 1920, however, was due to both an increase in prices and an increase in acreage. For example, land in farms increased only 1.3 per cent from 1940 to 1945, but 9.3 per cent from 1910 to 1920, with most of the increase occurring during the latter half of the decade. Moreover, the increase recorded by the 1945 agricultural census is for the most part a reflection of the census definition of a farm. The census definition of a farm excludes any tract of land under 3 acres unless its agricultural products were valued at $250 or more. The number of these smaller tracts reported as farms by the 1945 census was almost three times the number reported by the 1940 census. The increase was largely a reflection of the higher level of prices of farm products.

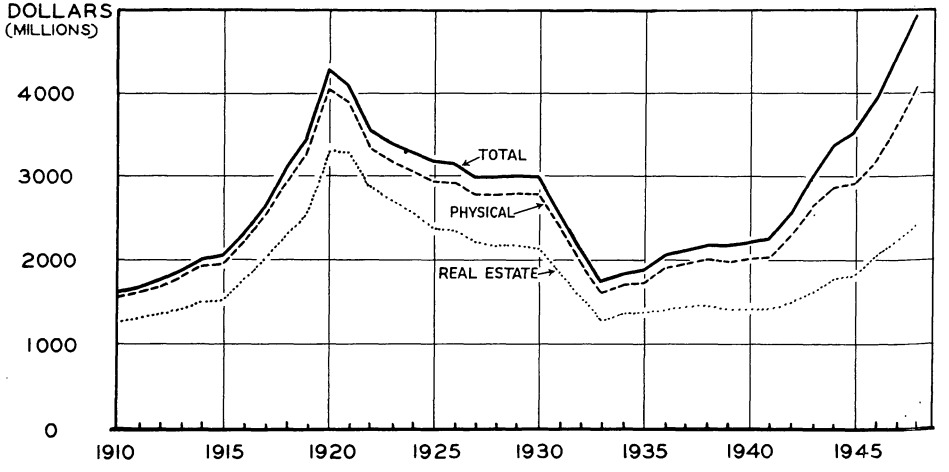

FIG. 14. Physical and financial assets.

Nonreal Estate Physical Assets

The value of nonreal estate physical assets, including crops, livestock, machinery, and motor vehicles, almost doubled from January 1, 1940, to the beginning of 1946. The 45 per cent increase in the following 2-year period brought the total to 1.6 billion dollars on January 1, 1948, which was more than twice the valuation recorded during the peak of values in the period of World War I.

The relative importance of price and volume on the changes in the inventory values of crops and livestock may be determined by adjusting the values to the January 1, 1940, price level and comparing these with the actual inventory values (figures 15 and 16). In the case of crops, the combined adjusted values of the important crops show a slight downward trend from 1940 to 1948, indicating that the increases in the inventory values were due entirely to price. The adjusted inventory values of livestock show a marked increase from January 1, 1940, to January 1, 1944, although during the first three years of this period the relative increase in price was much larger than the increase in the combined livestock physical inventory. The decline in actual inventory values in 1943 resulted from price declines because physical inventories reached their highest levels on January 1, 1944. The physical inventory then declined with the level on January 1, 1948, being below that of eight years earlier.

The inventory value of machinery and motor vehicles rose about 135 per

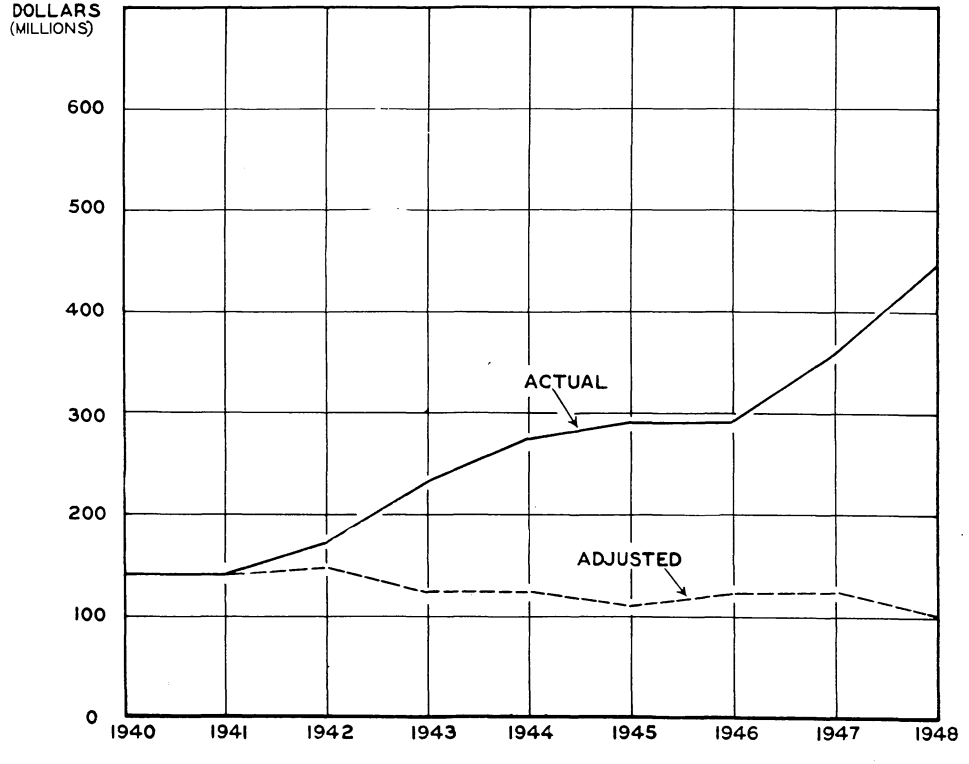

FIG. 15. Inventory values of crops on farms, actual and adjusted to the January 1, 1940, price level.

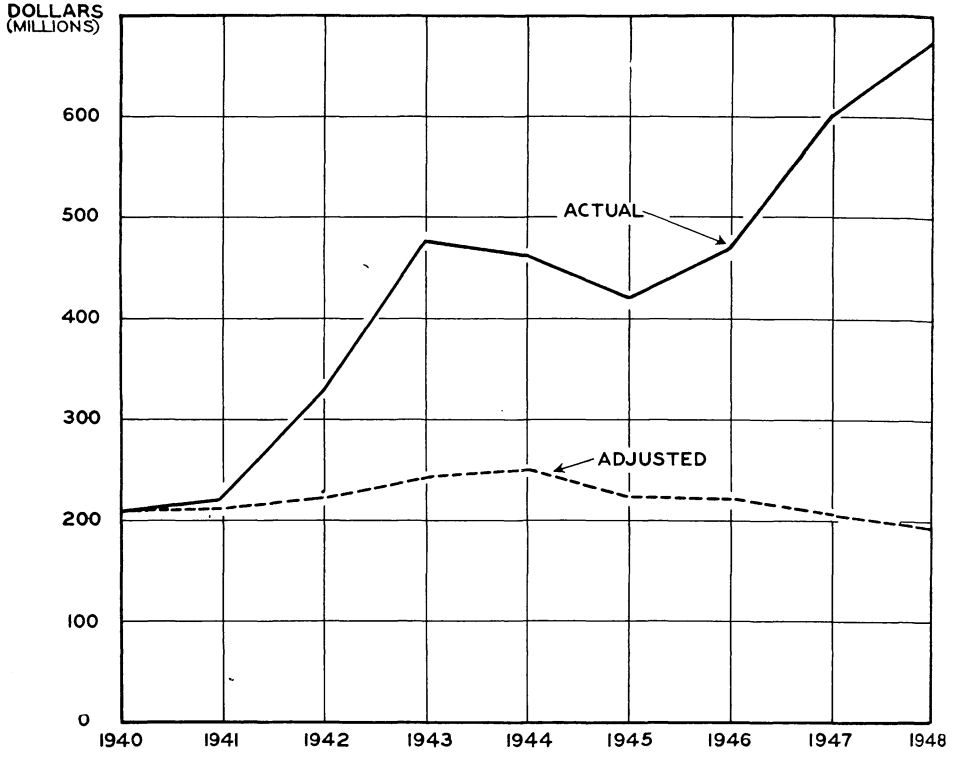

FIG. 16. Inventory values of livestock on farms, actual and adjusted to the January 1, 1940, price level.

cent from January 1, 1940, to the beginning of 1948. The value on the latter date was more than twice the value on January 1, 1921. The increases and decreases in the inventory values from year to year depend on purchases, depreciation, and adjustments for price changes. For example, the value on January 1, 1943, was 278 million dollars. The purchases in 1943 amounted to only 31 million dollars in contrast to a depreciation of 57 million dollars. The adjustment for the price increase in 1943 was 65 million dollars. The net change in inventory value, therefore, was 40 million dollars, with a resulting inventory value of 318 million on January 1, 1944. The depreciation of machinery and motor vehicles exceeded the purchases for each of the four years, 1942-1945, and if adjustments had not been made for the increased prices, the inventory values would have shown a decline.

Financial Assets

Financial assets undergo marked fluctuations depending on the degree of prosperity enjoyed by agriculture. During the recent war and the postwar years, circumstances favored the accumulation of financial assets. Farm income has been at a very high level, and during most of this period expenditures were materially restricted because of wartime regulations or reduced supplies of goods purchased by farmers. The liquid assets which have been built up are, therefore, at a level never before approached and represent a bulwark against the effects of a declining

price level. On January 1, 1948, the estimate of the financial assets approximated .9 billion dollars, an amount which was almost four times the estimate on January 1, 1920, and more than four times the value on the same date in 1940.

It is estimated that farmers held close to 135 million dollars in currency at the beginning of 1948. This was about the same as in 1920, but more than three times the volume in 1940.

Bank deposits owned by farmers on January 1, 1948, are estimated at 355 million dollars or triple the amount eight years earlier.[3] It is likely that a significant portion of the large increase has been at the expense of deterioration of the agricultural plant in view of the restricted expenditures on maaterials and equipment of which there were shortages. The peak of deposits in the period of World War I was about 136 million dollars.

Farmers as a group have participated liberally in the purchase of various types of bonds during periods of war. During World War I they purchased liberty bonds, and it is estimated that farmers held 37.8 million dollars worth of these bonds on January 1, 1921. Within the following 15 years, these bonds were liquidated by voluntary sales or by redemption of the particular issues. The purchase of war savings bonds during the past ten years has provided a very substantial reserve of purchasing power. On January 1, 1940, war savings bonds in the hands of Minnesota farmers were valued at 10 million dollars, but eight years later the amount had increased to 238 million dollars.

Investment in cooperatives represents the proportion of the net worth of cooperative marketing and purchasing associations to which farmers have a claim. The value of this investment reached a peak of 108 million dollars in 1948 or triple that on January 1, 1940. The large increase in the net worth of cooperatives is the result of an enlargement of the scope of operations and the retention of a significant proportion of the increased savings during the period as a means of building up of their own financial reserves.

LIABILITIES AND PROPRIETORSHIP

The equities in the assets of agriculture are held by two groups: The proprietors of the farming business and their creditors. It is the relation between the proprietors' equity and the claims of the creditors which has been and will continue to be of great significance with respect to the financial situation of agriculture.

Liabilities

FARM REAL ESTATE MORTGAGES

The real estate mortgage debt amounted to only 145 million dollars in 1910 or less than 12 per cent of the value of farm real estate (figure 17). During the land boom of the period of World War I, it increased rapidly and approximated 486 million dollars on January 1, 1920. The peak of 609 million dollars, however, was not reached until 1924, at which time the debt represented 24 per cent of the value of farm real estate. As has been noted, the large increase during the early 1920's was largely a result of the refinancing of nonreal estate debt. The rapid decline during the late 1920's and early 1930's was in part a reflection of forced liquidation, although during the latter years voluntary adjustments between lender and debtor were of considerable importance. By January 1, 1933, real estate mortgage debt had declined to 400 million dollars, but this was almost one third of the value of farm real estate at that time. During the next few years the general trend of real estate debt was quite irregular, but

[3] Estimates of bank deposits supplied in part by Norman J. Wall, Division of Agricultural Finance, B.A.E.

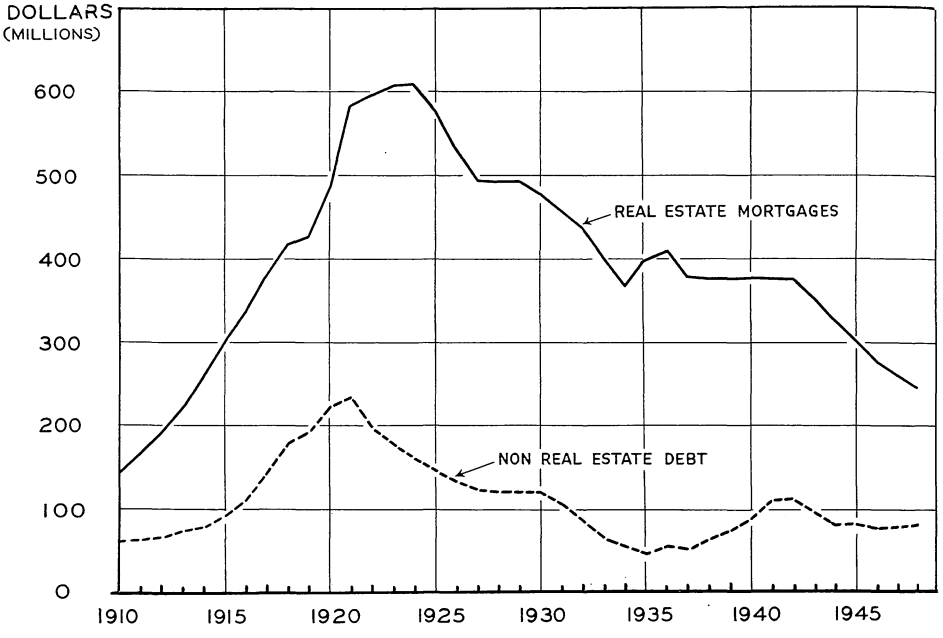

FIG. 17. Farm real estate mortgages and nonreal estate debt.

from January 1, 1937, to January 1, 1942, the debt remained practically unchanged, amounting to 375 million dollars at the end of the period.

On January 1, 1948, the debt was 245 million dollars, or 131 million dollars less than at the beginning of 1940. This decline was not particularly marked in view of the high farm income and the limited alternative uses of the income. The actual repayment of outstanding loans during the period, however, was somewhat obscured because new loans were being made at a relatively higher appraised value. The debt at the beginning of the current year was about 10 per cent of the value of farm real estate compared with 25 per cent on January 1, 1942.

NONREAL ESTATE DEBT

Nonreal estate debt represented by loans obtained from commercial banks was at a peak in 1920-21, reaching a total of 235 million dollars on January 1, 1921 (figure 17).[4] In subsequent years, nonreal estate debt declined almost continuously until 1935. It amounted to 47 million dollars on January 1 of that year and represented not only loans obtained from commercial banks but also those extended by the various governmental agencies in operation at that time. The expansion of nonreal estate debt from 1938 to 1942 was followed by a sharp decline which continued until 1947. The high net income and accumulated reserves built up during the war and postwar years not only made it unnecessary in general to obtain additional financing but also have enabled farmers to retire some of the existing obligations. The increase during 1947 is probably the result of the rapidly increasing production costs.

[4] Estimates of personal and collateral loans obtained from commercial banks supplied by Norman J. Wall, Division of Agricultural Finance, B.A.E.

PROPRIETORS' EQUITY

The proprietors in agriculture include mainly owner-operators, tenants, and landlords not living on farms. While the stockholders of corporations operating farms are also proprietors, they represent only a minor degree of ownership in Minnesota at the present time.

The proprietors' equity on January 1, 1948, was about 4.6 billion dollars, as compared with 3.6 billions on the same date in 1920 and 1.8 billion dollars at the beginning of 1940. The marked increase during the past eight years is largely a reflection of increased value of assets, as debt showed only a moderate decline. The significance of the increase in proprietors' equity cannot be evaluated without taking into consideration the influence of price advances on the value of assets, particularly that of farm real estate. A price decline will reverse the trend in land values, with an accompanying decline in proprietors' equity.

RELATIONS BETWEEN VARIOUS ITEMS

Some of the more important changes in the relation between items in the balance sheet are the proportion that real estate or other items is of the total assets and the ratio of proprietors'

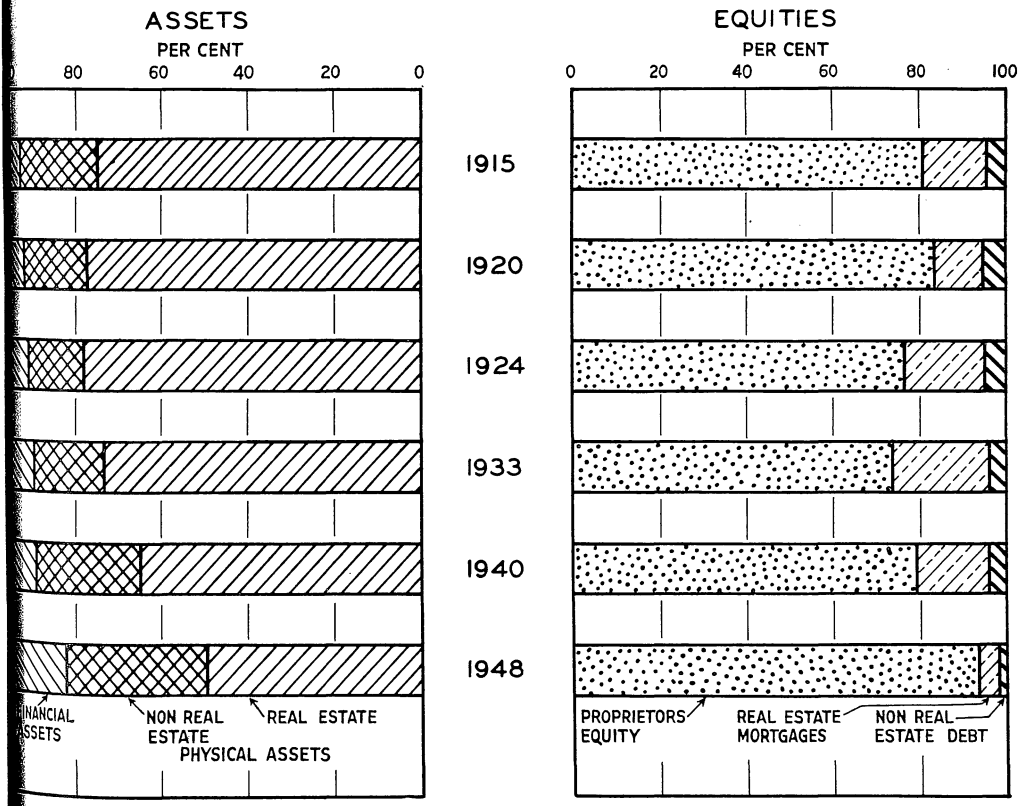

FIG. 18. Distribution of farm assets and equities.

equity to total debt. In the case of the latter, a ratio of 3 to 1 indicates that there are three dollars worth of owners' capital in agriculture to one dollar of creditors' capital.

Examination of figure 18 shows that the valuation of real estate was about three-fourths of the valuation of all assets on January 1, 1915. The proprietors held unencumbered title to about four-fifths of both the real estate and total assets. The ratio of proprietorship to debt was 4 to 1.

During the next five years the value of real estate increased somewhat more rapidly than nonreal estate assets and the proprietors' equity more rapidly than the debt obligations. The proprietors' equity in real estate on January 1, 1920, represented about the same proportion as in 1915, but the ratio of proprietorship to total debt had increased to 5 to 1. At the peak of real estate mortgage debt in 1924, the proprietors' equity in real estate had declined to three-fourths of the real estate valuation, and the ratio of proprietorship to total debt to 3.3 to 1. During the depression period of the early 1930's real estate still constituted about three-fourths of the total value of assets, but the proprietors' equity in real estate dropped to its lowest point. On January 1, 1933, the equity represented only 69 per cent of the real estate valuation. If consideration were given only to the situation on mortgaged farms, the proportion would be much lower. The ratio of proprietorship to debt also reached its lowest point of 2.8 at this time.

Some of the more significant changes in the relation between items of the balance sheet have occurred subsequent to 1933 and especially since the start of World War II. The relative increase in the valuation of real estate has been moderate compared with other asset items, and in consequence this item has represented a declining proporition of the total assets. On January 1, 1948, valuation of real estate was only 49 per cent of the value of all assets compared with 65 per cent on the same date in 1940. The financial assets have shown the largest relative increase, the proportion increasing from 9 per cent in 1940 to more than double that figure in later years. As a result of the large increase in real estate values and the moderate decline in debt, the proprietors had an equity in real estate on January 1, 1948, amounting to 90 per cent of the latter's valuation compared with 74 per cent at the beginning of 1940. Probably the most significant change occurred in the ratio of proprietors' equity to total debt. This ratio changed from 3.8 to 1 in 1940 to 14.0 to 1 at the start of 1948, which means that there were 14 dollars of owners' capital in agriculture to one dollar of creditors' capital.

SIGNIFICANCE OF RECENT CHANGES IN THE BALANCE SHEET

The period 1940 to 1948 has been one of great improvement in the financial status of Minnesota agriculture. The proprietors' equity has reached a level far above that of any previous period as a result of increases in the dollar value of both physical and financial assets and a moderate decline in the financial obligations. In addition, the financial condition is characterized by a high degree of liquidity which is in part a consequence of the accumulation of cash reserves, as currency, bank deposits, and government bonds. On the other hand, with the exception of the financial assets, a significant proportion of the increase in valuation of assets has been due to increases in price, and a reversal of the price structure could easily change the financial picture.

During the eight-year period ending December 31, 1948, the valuation of real estate increased 1.0 billion dollars; nonreal estate physical assets slightly less than 1.1 billion dollars; and financial assets almost .7 billion dollars: a

total gain of 2.7 billion dollars. In as much as a large proportion of these increases is the result of the rapid increase in prices, the maintenance of the high valuation of assets is mainly dependent on a continuation of the high level of farm prices. It is not to be expected that the price level prevailing in 1947 will be sustained unless there are intensive preparations for another war. The decline of grain and livestock prices during the early months of 1948 is probably an indication of the type of adjustment which agriculture may experience during the next few years. It is not anticipated, however, that the near future will compare with the years following World War I in the difficulties encountered by farmers as a group, even with a downward trend in prices.

For purposes of comparison, it is assumed that the gains in the valuation of the respective assets between January 1, 1940, and January 1, 1948, will be reduced by the following percentages: real estate, 70 per cent; nonreal estate items, 40 per cent; and financial assets, 15 per cent. This would involve a total reduction of 1.2 billion dollars, resulting in total assets of 3.7 billion dollars compared with 2.2 billion dollars on January 1, 1940, and 4.9 billion at the beginning of 1948. Assuming an increase of 25 million dollars in real estate mortgages, the proprietors' equity would decline to 3.4 billion dollars compared with 4.6 billion dollars on January 1, 1948. The effect of these changes on the various relationships is shown below:

	Proprietors' equity in real estate	Ratio of proprietors' equity to total debt
	Per cent	
January 1, 1940	74	3.8
January 1, 1948	90	14.0
After adjustments	85	9.5

Even with these adjustments, the financial status of Minnesota agriculture would still be relatively favorable. The purchasing power of the liquid assets would be enhanced by any decline in the general price level, the increase in all likelihood more than offsetting the lower amount of these assets.

While the general financial status of farmers as a group, as indicated by probable balance sheets of the future, is expected to be fairly bright for some years, the situation as regards certain individual farmers will be quite different. The rise in the value of real estate and other physical assets has required that the down payments and the debts of those who buy farms, livestock, and equipment at the higher price levels be increased in the same proportion that prices rise. Thus, those who have started farming recently and who have not enjoyed several years of high income will meet serious financial obstacles with a reduction in the value of the assets which they have acquired. Individuals who have purchased farms at the prices prevailing during the past two years have taken a considerable risk that farm income will not continue at present levels. This risk is particularly serious when farms are purchased at high prices and are mortgaged. The payments that become due, including principal and interest on the mortgages, are fixed charges; and if income declines severely, it may not provide enough funds to meet the payments. Even if these payments can be met, there will likely be a deficiency of funds to meet the desirable outlays for farming and living.

Probably the most important consideration of those who have had the opportunity of building up the liquid assets during the years of high income is to conserve these assets. Restraint in expenditures in this period of highly inflated prices will protect against dissipation of both current income and the liquid assets. The continued maintenance of the reserves not only will moderate the effects of the transition to a lower price level, but also will provide for a greater purchasing power after the transition has occurred.

Summary

The agricultural income of Minnesota was about 925 million dollars in 1947, which was more than four times the average of the years 1935 to 1939 and twice the former peak in 1918. Agricultural income consists of the receipts from the various sources after deductions have been made for the contributions of other sectors of the economy to the agricultural output. The items deducted are nonlabor cash production expenses, property taxes, and depreciation; an adjustment is made for inventory changes.

Farm operators received about 83 per cent of this agricultural income in 1947, compared with 73 per cent in 1935 to 1939. Hired labor received 8 per cent; holders of farm mortgages, about one per cent in the form of interest payments; and landlords not on farms, almost 8 per cent.

The total income of farm operators, including that from agriculture, wages received for nonfarm work, and the estimated rental value of the farm house, exceeded 848 million dollars in 1947.

Net cash income of agriculture has been the main source of cash funds available for expenditure, although it has been supplemented at times by funds obtained from borrowing and from accumulated financial reserves. The construction of buildings and the purchase of machinery and equipment normally absorb a large proportion of the cash funds, although during the past few years of high income, increasing amounts of the available cash funds have been used to retire outstanding indebtedness and to build up cash reserves to record levels.

Minnesota agriculture on January 1, 1948, had assets of almost 5 billion dollars, a fourfold increase since 1939. This increase has been due mainly to changes in price rather than to changes in physical inventories. The financial assets—including currency, bank deposits, U. S. government bonds, and investment in cooperatives—were 866 million dollars at the beginning of 1948 or four times those of January 1, 1940. Although this represents only a twofold increase in purchasing power, accumulation of such a large amount of assets is one of the main reasons why Minnesota agriculture is characterized by a high degree of liquidity at the present time.

One of the principal features of the financial structure of Minnesota agriculture is the relatively low indebtedness. The ratio of proprietors' equity in the assets to debt was 14.0 to 1 on January 1, 1948, compared with 3.8 to 1 on January 1, 1940.

Although the financial position of farmers as a group is excellent at the present time, a declining price level can easily change the overall picture and the position of certain individual farmers. The rise in the value of real estate and other physical assets has required a much larger investment by those who have purchased farms, livestock, and equipment at the higher price levels. Those who have recently had to go into debt heavily in order to start farming, therefore, have not had the advantage of several years of favorable income.

Those farmers who have been fortunate in building up liquid reserves in the form of bank deposits and government bonds should aim to conserve these assets. Restraint in expenditures and the continued maintenance of reserves during the present period of highly inflated prices will moderate the effect of a transition to a lower price level.